

Center for Engineering Design

Mission

The Center for Engineering Design (CED) exists to develop original solutions for technological challenges. By utilizing state-of-the-art equipment and research facilities, the CED can and will continue to bring innovative ideas in the form of superior products to the marketplace.

The Center

Founded in 1973, the Center for Engineering Design (formerly the Center for Biomedical Design) under the direction of Dr. Stephen C. Jacobsen, has become an internationally renowned research and development facility. The CED began primarily as a bioengineering facility specializing in medically-related technologies. Today, the CED has expanded its areas of expertise to include robotics, micro-electro mechanical systems, teleoperation systems, human emulation, virtual world interfaces, novel drug delivery systems and sophisticated manufacturing and fabrication technologies.

Working with companies as diverse as Walt Disney Imagineering, Merck Sharp and Dohme, and Hydro Quebec, as well as a host of government agencies and universities, the CED has developed both functional prototypes and products for the entertainment, research and development, heavy industry, and

medical fields. Drawing upon the rich human resource base at the University of Utah, the CED's unparalleled staff have propelled it to the forefront of engineering research.

Highlights and Specialties

Two of the many innovations pioneered by the CED's researchers are the RDT (rotary displacement transducer) and the Dextrous Teleoperation System, a high dexterity, general purpose, anthropomorphic robotic master/slave arm.

- The RDT is an integrated chip-based rotary position encoder. The RDT is unique, as compared with other sensors, because of its digital multiplexed output, "dime" size, high resolution, and a price tag that is cheaper than existing products that possess only a fraction of the RDT's features. The RDT enables robots to be made smaller, lighter weight, possess greater reliability, and be more cost competitive, thereby, increasing their range of applicability and their market size.



RDT - an integrated chip-based rotary position encoder.

- The Dextrous Teleoperation System surpasses the severely limited, traditional robotic manipulators with their restricted ranges of motion, limited functionality, and difficulty in carrying out dexterous tasks. Because the Dextrous Teleoperation System can duplicate the motions of a human arm and allow the



Dextrous Arm
developed at CED.

operator to feel the forces being felt by the slave arm, it is capable of deftly manipulating even the most fragile objects and effectively acquiring and using a wide variety of standard tools. The system has been configured to successfully carry out complex tasks in unstructured environments, especially those that were originally configured to be worked in by people, but are now considered hazardous or unpleasant. The Dextrous Arm is currently in use in leading world research laboratories as well as in teleoperation applications such as the maintenance and repair of high tension, high voltage power lines.

The system can be used in three basic modes: 1) as a master/slave teleoperation system, 2) as a slave that is controlled autonomously by a computer, or

3) as a virtual world interface able to transmit high fidelity force and position information directly to the person from the virtual world.

For more information, please contact:

Stephen Jacobsen
Center for Engineering Design
3176 Merrill Engineering Building
Salt Lake City, Utah 84112
Tel: (801) 581-6499
Fax: (801) 581-5304